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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :

Anton ESSER, et al. : EXAMINER: CORDRAY, D. R.

SERIAL NO.: 10/590,933 :

FILED: AUGUST 28, 2006 : GROUP ART UNIT: 1791

FOR: METHOD FOR PRODUCING PAPER, PAPERBOARD AND CARDBOARD

DECLARATION UNDER 37 C.F.R. §1.132

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

I, Anton Esser, Dr. rer. nat., a citizen of the Federal Republic of Germany and residing at 24, Mainzerstraße, 67117 Limburgerhof, Federal Republic of Germany, declare as follows:

1. I am a fully trained physicist, having studied physics at the Technical University of Aachen, from 1981 to 1986; and at the Technical University of Aachen for the doctorate degree from 1987 – 1992;

I joined BASF SE of 67056 Ludwigshafen, Federal Republic of Germany, the assignee of the above-identified application, in 1992, and have worked in the research department of polymer physics for eight years;

I am a named inventor of the above-identified application.

I have been working on the development of paper additives, including polymers for filler treatment since 2000.

2. I am familiar with the claims, and have read the Office Action mailed August 11, 2009 in the above-identified application.

3. Under my supervision three new examples according to the invention and six comparative examples were carried out as follows:

4. The following additional polymers were used:

PVAm 4:

Polymer of 1 mol% of vinylamine units and 99 mol% of N-vinylformamide units, having a molecular mass of 2 million D (prepared by partial hydrolysis of poly-N-vinylformamide)

PVAm 5:

Polymer of 20 mol% of vinylamine units and 80 mol% of N-vinylformamide units, having a molecular mass of 2 million D (prepared by partial hydrolysis of poly-N-vinylformamide)

PVAm6:

Polymer of 10 mol% of vinylamine units and 90mol% of N-vinylformamide units, having a molecular mass of 400 000 D (prepared by partial hydrolysis of poly-N-vinylformamide)

#### 5. Blank

Paper stock is prepared from the following components: 14 wt% pine sulfate, 34 wt% of bleached birch sulfate, 21 wt% of coated broke and 31 wt% of ground calcium carbonate. The components are mixed at 4 % consistency (based on dry paper stock) for 30 minutes.

After that the high consistency stock is diluted to 0,5 % consistency by adding water. The diluted stock is stirred at low speed for another 2 minutes. 250ml of the diluted stock is then filtered in a dynamic drainage jar using a screen with 80  $\mu\text{m}$  wire opening. The number and size of white pitch particles in the filtrate is then counted using the BASF laser pitch counter. The principle of this instrument and the measurement have been described in: Nordic Pulp Paper Research Journal, Vol 9(1), page 26 – 30, (1994).

#### 6. Additional Examples (2,3,4)

Paper stock is prepared from the following components: 14 wt% pine sulfate, 34 wt% of bleached birch sulfate, 21 wt% of coated broke and 31 wt% of ground calcium carbonate. The components are mixed at 4 % consistency (based on dry paper stock) for 15 minutes.

After mixing the 400 g/t of PVAm X ( $X = 3, 4, 5$ ) is added to the stock and the stock is again mixed for 15 minutes. After that the high consistency stock is diluted to 0,5% consistency by adding water. The diluted stock is stirred at low speed for another 2 minutes. 250 ml of the diluted stock is then filtered in a dynamic drainage jar using a screen with 80  $\mu\text{m}$  wire opening. The number and size of white pitch particles in the filtrate is then counted using the BASF laser pitch counter.

A good result with stock treatment is achieved when the total number of pitch particles at a size above 15  $\mu\text{m}$  has been reduced by more than 80 % relative to the blank. This corresponds to the situation of the amount and size distribution of white pitch measured in the white water of the paper machine in case in Example 1.

#### 7. Comparative Examples (4,5,6)

Paper stock is prepared from the following components: 14 wt% pine sulfate, 34 wt% of bleached birch sulfate, 21 wt% of coated broke and 31 wt% of ground calcium carbonate. The components are mixed at 4 % consistency (based on dry paper stock) for 30 minutes.

After that the high consistency stock is diluted to 0, 5% consistency by adding water. After dilution 400 g/t of PVAm X (X = 3, 4, 5) is added to the stock and the stock is again mixed for 15 minutes. The diluted stock is stirred at low speed for another 2 minutes. 250 ml of the diluted stock is then filtered in a dynamic drainage jar using a screen with 80  $\mu\text{m}$  wire opening. The number and size of white pitch particles in the filtrate is then counted using the BASF laser pitch counter.

#### 8. Comparative Examples (7,8,9)

Paper stock is prepared from the following components: 14 wt% pine sulfate, 34 wt% of bleached birch sulfate, 21 wt% of coated broke and 31 wt% of ground calcium carbonate. The components are mixed at 4 % consistency (based on dry paper stock) for 15 minutes.

After mixing the 400 g/t of PVAm X (X = 1, 2, 6) is added to the stock and the stock is again mixed for 15 minutes. After that the high consistency stock is diluted to 0,5 % consistency by adding water. The diluted stock is stirred at low speed for another 2 minutes. 250 ml of the diluted stock is then filtered in a dynamic drainage jar using a screen with 80  $\mu\text{m}$  wire opening. The number and size of white pitch particles in the filtrate is then counted using the BASF laser pitch counter.

9. The results of Additional Examples 2, 3, 4 and Comparative Examples 4 – 9 are summarized in the following table:

	Polymer	Reduction in the number of pitch particles per volume at a particle size > 15 $\mu\text{m}$ relative to blank [in %]
Additional Example 2	PVAm 3	89
Additional Example 3	PVAm 4	85
Additional Example 4	PVAm 5	83
Comparative Example 4	PVAm 3	52
Comparative Example 5	PVAm 4	44
Comparative Example 6	PVAm 5	48
Comparative Example 7	PVAm 1	39
Comparative Example 8	PVAm 2	31
Comparative Example 9	PVAm 6	42

10. These data directly demonstrate that on the one hand the invention is realizable in a broader scope of polyvinylamines (i.e. different degree of hydrolysis). Additionally, the Comparative Examples demonstrate that the addition of polyvinylamines to the low consistency stock lead to worse results in reduction of pitch particles, respectively in fixing of pitch particles.

11. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

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Signature

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Date